

10 June 2002
(R83-HEV-Rev 4)

**PROPOSAL FOR AMENDMENTS
TO THE 05 SERIES OF AMENDMENTS TO REGULATION No. 83**

(Emissions of pollutants of vehicles)

Prescriptions concerning type-approval of hybrid vehicles

Transmitted by the expert from France

Note : The text reproduced hereafter was prepared by the GRPE ad'hoc Working Group on hybrid vehicles including experts from Germany, Netherlands, Japan, Sweden, Italy, United-Kingdom, OICA and France.

In Contents: Insert new Annex 14, to read:

Annex 14 : Emissions test procedure for hybrid electric vehicles.

Appendix 1 - Electric energy/power storage device SOC profile for OVC HEV Type I test.

In paragraph 1. Scope: Insert new paragraphs 1.1.3. and 1.1.4, to read:

"1.1.3. Exhaust emissions at normal and low ambient temperature, evaporative emissions, emissions of crankcase gases, the durability of pollution control exhaust devices and on-board diagnostic (OBD) systems of hybrid electric vehicles (HEV) equipped with positive-ignition (P. I.) engines which have at least 4 wheels.

1.1.4 Exhaust emissions, the durability of anti-pollution devices and on-board diagnostic (OBD) systems of hybrid electric vehicles (HEV) of categories M 1 and N 1 equipped with compression-ignition (C. I.) engines which have at least 4 wheels and a maximum mass not exceeding 3,500 kg.

Items 1.1.3. to 1.1.5. (former), renumber as items 1.1.5. to 1.1.7.

In paragraph 2. Definitions: Insert new paragraph 2.21., to read:

2.21. Hybrid vehicles (HV)

2.21.1 General definition of hybrid vehicles (HV)

“Hybrid vehicle (HV)” means a vehicle with at least two different energy converters and two different energy storage systems (on vehicle) for the purpose of vehicle propulsion.

2.21.2 Definition of hybrid electric vehicles (HEV)

“Hybrid electric vehicle (HEV)” means a vehicle that can draw mechanical propulsion energy from both of the following on-vehicle sources of stored energy/power :

- a consumable fuel
- an electrical energy/power storage device (e.g. : battery, capacitor, flywheel/generator...)

In paragraph 5.2. Test procedure:

Paragraph 5.2.1, amend to read :

"5.2.1. Positive ignition engine-powered vehicles and hybrid electric vehicles equipped with a positive-ignition engine shall ...

Paragraph 5.2.2, amend to read:

5.2.2. Positive-ignition engine-powered vehicles and hybrid electric vehicles equipped with a positive-ignition engine fuelled with LPG or NG only shall ...

Paragraph 5.2.3. amend to read :

"5.2.3. Compression ignition engine-powered vehicles and hybrid electric vehicles equipped with a compression ignition engine shall ...

Paragraph 5.3.7.1. insert new paragraph to read :

... with this amendment.

For hybrid electric vehicles, if necessary, the manufacturer shall provide a special procedure for inspection testing.

(C.O.P.) Insert in paragraph 8.2.3.1., a new paragraph to read:

"8.2.3.1 to the vehicles selected.

For hybrid electric vehicles (HEV), the tests are carried out under the conditions determined in Annex 14:

- For OVC vehicles, the measurements of emissions of pollutants are carried out with the vehicle conditioned according to condition B of the type I test for OVC hybrid vehicles.
- For NOVC vehicles, the measurements of emissions of pollutants are carried out under the same conditions as in the type I test for NOVC vehicles.

Insert in paragraph 8.2.3.2.3 (i)., a new paragraph to read:

"8.2.3.2.3 (i)..... shall be complied with.

For hybrid electric vehicles (HEV), the tests are carried out under the conditions determined in Annex 14 paragraph 5.

Insert in paragraph 8.2.6.1., a new paragraph to read:

"8.2.6.1 appendix 1.

For hybrid electric vehicles (HEV), the tests are carried out under the conditions determined in Annex 14 paragraph 9

(special provisions for O.B.D.) Insert new paragraphs (d) and (e) in 11.1.5.1., to read:

- " (d)
 - Hybrid electric vehicles (HEV) equipped with positive-ignition engines,
 - Hybrid electric vehicles (HEV) equipped with compression-ignition engines of category M1 other than vehicles whose maximum mass exceeds 2 500 kg,
 - and Hybrid electric vehicles (HEV) of category N1 class 1 equipped with compression-ignition engines,from 1 January 2005 for new types and from 1 January 2006 for all types.
- (e)
 - Hybrid electric vehicles (HEV) of category N1 , classes II and III, equipped with compression-ignition engines,
 - and Hybrid electric vehicles (HEV) of category M1 equipped with compression-ignition engines, whose maximum mass exceeds 2500 kg,from 1 January 2006 for new types and from 1 January 2007 for all types.

Annex 1.

ENGINE AND VEHICLE CHARACTERISTICS

Paragraph 4. amend to read :

"4. DESCRIPTION OF ENERGY CONVERTERS

4.1 Engine manufacturer :

...

Insert new items 4.3., to read:

- 4.3 Hybrid Electric Vehicle : yes/no
- 4.3.1. Category of Hybrid Electric vehicle : Off Vehicle Charging/Not Off Vehicle Charging
- 4.3.2. Operating mode switch : with/without
- 4.3.2.1 Selectable modes:
- 4.3.2.1.1 Pure electric : yes/no
- 4.3.2.1.2 Pure fuel consuming : yes/no
- 4.3.2.1.3 Hybrid modes : yes/no (if yes, short description)
- 4.3.3 Description of the energy storage device: (battery, capacitor, flywheel/generator...)
- 4.3.3.1 Make:.....
- 4.3.3.2 Type:.....
- 4.3.3.3 Identification number:.....
- 4.3.3.4 Kind of electrochemical couple:.....
- 4.3.3.5 Energy :(for battery: voltage and capacity Ah in 2 h, for capacitor: J, ...)
- 4.3.3.6 Charger: on board/ external/ without
- 4.3.4 Electric machines (describe each type of electric machine separately)
- 4.3.4.1 Make:
- 4.3.4.2 Type:
- 4.3.4.3 Primary use: traction motor / generator
- 4.3.4.3.1 When uses as traction motor: monomotor/ multimotors (number):
- 4.3.4.4 Maximum power:kW
- 4.3.4.5 Working principle:
- 4.3.4.5.1 direct current/ alternating current /number of phases:
- 4.3.4.5.2 separate excitation/ series/ compound
- 4.3.4.5.3 synchronous / asynchronous
- 4.3.5 Control unit
- 4.3.5.1 Make :.....
- 4.3.5.2 Type :.....
- 4.3.5.3 Identification number :.....
- 4.3.6 Power controller
- 4.3.6.1 Make :.....
- 4.3.6.2 Type :.....
- 4.3.6.3 Identification number :.....
- 4.3.7 Vehicle electric range (according annex 7 of R101) :.....km
- 4.3.8 Manufacturer's recommendation for preconditioning :.....

Add a new annex 14, to read:

"Annex 14

EMISSIONS TEST PROCEDURE FOR HYBRID ELECTRIC VEHICLES

1. INTRODUCTION

- 1.1. This annex defines the specific provisions regarding type-approval of a hybrid electric vehicle (HEV) as defined in paragraph 2.21.2 of this Regulation.
- 1.2. As a general principle, for the tests of type I, II, III, IV, V, VI and OBD, hybrid electric vehicles will be tested according to Annex 4, 5, 6, 7, 9, 8 and 11 respectively, unless modified by the present Annex.
- 1.3. For the type I test only, OVC vehicles (as categorised in paragraph 2) will be tested according to the most electric condition (condition A) and the most fuel consuming conditions (condition B).
. The test results under both conditions A and B and the weighted values will be reported in the communication form.
- 1.4. The emissions test results must comply with the limits under all specified test conditions of this regulation.

2. CATEGORIES OF HYBRID ELECTRIC VEHICLES

Vehicle charging	Off-Vehicle Charging ^(a) (OVC)		Not Off-Vehicle Charging ^(b) (NOVC)	
	Without	With	Without	With
Operating mode switch				

(a) also known as "externally chargeable"

(b) also known as "not externally chargeable"

3. TYPE I TEST METHODS

3.1 EXTERNALLY CHARGEABLE (OVC HEV) WITHOUT AN OPERATING MODE SWITCH

3.1.1 **Two tests are performed under the following conditions :**

Condition A : test has to be carried out with a fully charged electrical energy/power storage device.

Condition B : test has to be carried out with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity).

The profile of the state of charge (SOC) of the electrical energy/power storage device during different stages of the Type I test is given in Appendix 1.

3.1.2 Condition A

- 3.1.2.1 The procedure starts with the discharge of the electrical energy/power storage device of the vehicle while driving (on the test track, on a chassis dynamometer, etc.) :
- at a steady speed of 50 km/h until the consumable fuel power unit of the HEV starts up,
 - or, if a vehicle can not reach a steady speed of 50 km/h without starting up the fuel consuming power unit, the speed has to be reduced until the vehicle can run a lower steady speed where the fuel consuming power unit just does not start up for a defined time/distance (to be specified between technical service and manufacturer),
 - or with manufacturer's recommendation.
 - The engine is stopped within 10 seconds after it has started.
- 3.1.2.2 Conditioning of vehicle
- 3.1.2.2.1 For compression-ignition engined vehicles the Part Two cycle described in appendix 1 of annex 4 shall be used. Three consecutive cycles shall be driven.
- 3.1.2.2.2 Vehicles fitted with positive-ignition engines are preconditioned with one Part One and two Part Two driving cycles.
- 3.1.2.3 After this preconditioning, and before testing, the vehicle shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30° C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room, and the electrical energy/power storage device is fully charged as a result of the charging prescribed in paragraph 3.1.2.4.
- 3.1.2.4 During soak, the electrical energy/power storage device shall be charged according to a normal overnight charge procedure:
- (a) with the on board charger if fitted,
 - (b) with an external charger recommended by the manufacturer, the connection being made with the domestic plug whose pattern has been recommended by the manufacturer,
- The procedure excludes all types of special charges that could be automatically or manually initiated like, for instance, the equalisation charges or the servicing charges.
The car manufacturer shall be in a position to attest that during the test, a special charge procedure has not occurred.
- 3.1.2.5 Test procedure
- 3.1.2.5.1 The vehicle shall be started up by means of the devices provided for this purpose. The first cycle starts on the initiation of the vehicle start-up procedure.
- 3.1.2.5.2 Sampling shall begin (BS) before or at the initiation of the vehicle start up procedure and end on conclusion of the final idling period in the extra-urban cycle (Part Two, end of sampling (ES)).
- 3.1.2.5.3 The vehicle shall be driven according to annex 4, or in case of special gear shifting strategy according to the manufacturer's instructions, as incorporated in the drivers' handbook of production vehicles and indicated by a technical gear shift instrument (for drivers information).
- 3.1.2.5.4 The exhaust gases shall be analysed according to Annex 4.
- 3.1.2.6 The test results are compared to the limits according to paragraph 5.3.1.4 of this Regulation and the average emission of each pollutant for Condition A is calculated (M1i).

3.1.3 Condition B

3.1.3.1 Conditioning of vehicle

3.1.3.1.1 For compression-ignition engined vehicles the Part Two cycle described in appendix 1 of Annex 4 shall be used. Three consecutive cycles shall be driven.

3.1.3.1.2 Vehicles fitted with positive-ignition engines are preconditioned with one Part One and two Part Two driving cycles.

3.1.3.2 The electrical energy/power storage device of the vehicle is discharged while driving (on the test track, on a chassis dynamometer, etc.) :

- at a steady speed of 50 km/h until the consumable fuel power unit of the HEV starts up,
- or if a vehicle can not reach a steady speed of 50 km/h without starting up the fuel consuming power unit, the speed has to be reduced until the vehicle can run a lower steady speed where the fuel consuming power unit just does not start up for a defined time/distance (to be specified between technical service and manufacturer),
- or with manufacturer's recommendation.
- The engine is stopped within 10 seconds after it has started.

3.1.3.3 After this preconditioning, and before testing, the vehicle shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30° C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room.

3.1.3.4 Test procedure

3.1.3.4.1 The vehicle shall be started up by means of the devices provided for this purpose. The first cycle starts on the initiation of the vehicle start-up procedure.

3.1.3.4.2 Sampling shall begin (BS) before or at the initiation of the vehicle start up procedure and end on conclusion of the final idling period in the extra-urban cycle (Part Two, end of sampling (ES)).

3.1.3.4.3 The vehicle shall be driven according to Annex 4, or in case of special gear shifting strategy according to the manufacturer's instructions, as incorporated in the drivers' handbook of production vehicles and indicated by a technical gear shift instrument (for drivers information).

3.1.3.4.4 The exhaust gases shall be analysed according to Annex 4

3.1.3.5 The test results are compared to the limits according to paragraph 5.3.1.4 of this Regulation and the average emission of each pollutant for Condition B is calculated (M2i).

3.1.4 Test results

3.1.4.1 For communication, the weighted values are calculated as below:

$$M_i = (D_e \cdot M1_i + D_{av} \cdot M2_i) / (D_e + D_{av})$$

Where :

M_i = mass emission of the pollutant i in grams per kilometre.

$M1_i$ = average mass emission of the pollutant i in grams per kilometre with a fully charged electrical energy/power storage device calculated in 3.1.2.6.

$M2_i$ = average mass emission of the pollutant i in grams per kilometre with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity) calculated in 3.1.3.5.

D_e = vehicle electric range , according to the procedure described in R101 Annex 7, where the manufacturer must provide the means for performing the measurement with the vehicle running in pure electric mode.

D_{av} = 25 km (average distance between two battery recharges)

3.2 EXTERNALLY CHARGEABLE (OVC HEV) WITH AN OPERATING MODE SWITCH

3.2.1 Two tests are performed under the following conditions :

3.2.1.1 **Condition A** : test has to be carried out with a fully charged electrical energy/power storage device.

3.2.1.2 **Condition B** : test has to be carried out with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity)

3.2.1.3 The switch is positioned according the table below :

Hybrid-modes	↳ Pure electric ↳ Hybrid	↳ Pure fuel consuming ↳ Hybrid	↳ Pure electric ↳ Pure fuel consuming ↳ Hybrid	↳ Hybrid mode n* ↳ ↳ Hybrid mode m*
Battery state of charge	Switch in position	Switch in position	Switch in position	Switch in position
Condition A Fully charged	Hybrid	Hybrid	Hybrid	Most electric hybrid mode
Condition B Min. state of charge	Hybrid	Fuel consuming	Fuel consuming	Most fuel consuming mode

* for instance : sport ,economic, urban, extra-urban position...

3.2.2 Condition A

3.2.2.1 The procedure starts with the discharge of the electrical energy/power storage device of the vehicle while driving with the switch in pure electric position (on the test track, on a chassis dynamometer, etc.) at a steady speed of $70 \% \pm 5 \%$ from the maximum speed of the vehicle according to R101.

Stopping the discharge occurs:

- when the vehicle is not able to run at 65 % of the maximum speed; or
- when an indication to stop the vehicle is given to the driver by the standard on-board instrumentation, or
- after covering the distance of 100 km.

If the vehicle is not equipped with a pure electric mode, the electrical energy/power storage device discharge is conducted with vehicle driving (on the test track, on a chassis dynamometer, etc.) :

- at a steady speed of 50 km/h until the consumable fuel power unit of the HEV starts up,
- or if a vehicle can not reach a steady speed of 50 km/h without starting up the fuel consuming power unit, the speed has to be reduced until the vehicle can run a lower steady speed where the fuel consuming power unit just does not start up for a defined time/distance (to be specified between technical service and manufacturer),
- or with manufacturer's recommendation.
- The engine is stopped within 10 seconds after it has started.

3.2.2.2 Conditioning of vehicle :

3.2.2.2.1 For compression-ignition engines the Part Two cycle described in appendix 1 to the annex 4 shall be used. Three consecutive cycles shall be driven.

3.2.2.2.2 Vehicles fitted with positive-ignition engines are preconditioned with one Part One and two Part Two driving cycles.

3.2.2.3 After this preconditioning, and before testing, the vehicle shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30° C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room, and the electrical energy/power storage device is fully charged as a result of the charging prescribed in paragraph 3.2.2.4..

3.2.2.4 During soak, the electrical energy/power storage device shall be charged according to a normal overnight charge procedure:

(a) with the on board charger if fitted,

(b) with an external charger recommended by the manufacturer, the connection being made with the domestic plug whose pattern has been recommended by the manufacturer,

The procedure excludes all types of special charges that could be automatically or manually initiated like, for instance, the equalisation charges or the servicing charges.

The car manufacturer shall be in a position to attest that during the test, a special charge procedure has not occurred.

3.2.2.5 Test procedure

3.2.2.5.1 The vehicle shall be started up by means of the devices provided for this purpose. The first cycle starts on the initiation of the vehicle start-up procedure.

3.2.2.5.2 Sampling shall begin (BS) before or at the initiation of the vehicle start up procedure and end on conclusion of the final idling period in the extra-urban cycle (Part Two, end of sampling (ES)).

- 3.2.2.5.3 The vehicle shall be driven according to Annex 4, or in case of special gear shifting strategy according to the manufacturer' s instructions, as incorporated in the drivers' handbook of production vehicles and indicated by a technical gear shift instrument (for drivers information).
- 3.2.2.5.4 The exhaust gases shall be analysed according to Annex 4.
- 3.2.2.6 The test results are compared to the limits according to paragraph 5.3.1.4 of this Regulation and the average emission of each pollutant for Condition A is calculated (M1i).
- 3.2.2.7 If the pure electric range of the vehicle is higher than 1 complete cycle, on the request of the manufacturer, the type I test is carried out on pure electric mode.

3.2.3 Condition B

- 3.2.3.1 Conditioning of vehicle :
 - 3.2.3.1.1 For compression-ignition engined vehicles the Part Two cycle described in appendix 1 to the Annex 4 shall be used. Three consecutive cycles shall be driven.
 - 3.2.3.1.2 Vehicles fitted with positive-ignition engines are preconditioned with one Part One and two Part Two driving cycles.
- 3.2.3.2 The electrical energy/power storage device of the vehicle is discharged according 3.2.2.1.
- 3.2.3.3 After this preconditioning, and before testing, the vehicle shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30° C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room.
- 3.2.3.4 Test procedure
 - 3.2.3.4.1 The vehicle shall be started up by means of the devices provided for this purpose. The first cycle starts on the initiation of the vehicle start-up procedure.
 - 3.2.3.4.2 Sampling shall begin (BS) before or at the initiation of the vehicle start up procedure and end on conclusion of the final idling period in the extra-urban cycle (Part Two, end of sampling (ES)).
 - 3.2.3.4.3 The vehicle shall be driven according to Annex 4, or in case of special gear shifting strategy according to the manufacturer' s instructions, as incorporated in the drivers' handbook of production vehicles and indicated by a technical gear shift instrument (for drivers information).
 - 3.2.3.4.4 The exhaust gases shall be analysed according Annex 4.
- 3.2.3.5 The test results are compared to the limits according paragraph 5.3.1.4 of this Regulation and the average emission of each pollutant for Condition B is calculated (M2i).

3.2.4 Test results

3.2.4.1 For communication, the weighted values are calculated as below:

$$M_i = (De \cdot M1_i + Dav \cdot M2_i) / (De + Dav)$$

Where :

M_i = mass emission of the pollutant i in grams per kilometre

$M1_i$ = average mass emission of the pollutant i in grams per kilometre with a fully charged electrical energy/power storage device calculated in 3.2.2.6.

$M2_i$ = average mass emission of the pollutant i in grams per kilometre with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity) calculated in 3.2.3.5.

De = vehicle electric range with the switch in pure electric position, according to the procedure described in R101 Annex 7. If there is not a pure electric position, the manufacturer must provide the means for performing the measurement with the vehicle running in pure electric mode.

Dav = 25 km (average distance between two battery recharge)

3.3 NOT EXTERNALLY CHARGEABLE (notOVC HEV) WITHOUT AN OPERATING MODE SWITCH

3.3.1 These vehicles are tested according to Annex 4.

3.3.2 For preconditioning, 2 consecutive complete driving cycles (one Part One and one Part two) are carried out without soak.

3.4 NOT EXTERNALLY CHARGEABLE (notOVC HEV) WITH AN OPERATING MODE SWITCH

3.4.1 These vehicles are preconditioned and tested in hybrid mode according to Annex 4. If several hybrid modes are available, the test is carried out in the mode that is automatically set after turn on of the ignition key (normal mode). On the basis of information provided by the manufacturer, the Technical Service will make sure that the limit values are met in all hybrid modes.

3.4.2 For preconditioning, 2 consecutive complete driving cycles (one Part One and one Part two) are carried out without soak.

4 TYPE II TEST METHODS

4.1 The vehicles are tested according to Annex 5 with the thermal engine running. The manufacturer shall provide a “service mode” that makes execution of this test possible.

4.2 If necessary, the manufacturer shall provide a special procedure for inspection testing.

5 TYPE III TEST METHODS

- 5.1 The vehicles are tested according to Annex 6 with the thermal engine running. The manufacturer shall provide a “service mode” that makes execution of this test possible.
- 5.2 The tests are carried out only on conditions 1 and 2 of the paragraph 3.2 of Annex 6. If for any reasons it is not possible to test on condition 2, alternatively another steady speed condition (with thermal engine running under load) should be carried out.

6 TYPE IV TEST METHODS

- 6.1 The vehicles are tested according to Annex 7.
- 6.2 Before starting the test procedure (paragraph 5.1 of Annex 7), the vehicles are preconditioned as follows:
- 6.2.1 For OVC vehicles :
- 6.2.1.1 OVC vehicles without an operating mode switch : the procedure starts with the discharge of the electrical energy/power storage device of the vehicle while driving (on the test track, on a chassis dynamometer, etc.):
- at a steady speed of 50 km/h until the consumable fuel power unit of the HEV starts up,
 - or if a vehicle can not reach a steady speed of 50 km/h without starting up the fuel consuming power unit, the speed has to be reduced until the vehicle can run a lower steady speed where the fuel consuming power unit just does not start up for a defined time/distance (to be specified between technical service and manufacturer),
 - or with manufacturer’s recommendation.
 - The engine is stopped within 10 seconds after it has started.
- 6.2.1.2 OVC vehicles with an operating mode switch : the procedure starts with the discharge of the electrical energy/power storage device of the vehicle while driving with the switch in pure electric position (on the test track, on a chassis dynamometer, etc.) at a steady speed of $70 \% \pm 5 \%$ from the maximum thirty minutes speed of the vehicle.
- Stopping the discharge occurs:
- when the vehicle is not able to run at 65 % of the maximum thirty minutes speed, or
 - when an indication to stop the vehicle is given to the driver by the standard on-board instrumentation, or
 - after covering the distance of 100 km.

If the vehicle is not equipped with a pure electric mode, the electrical energy/power storage device discharge is conducted with the vehicle driving (on the test track, on a chassis dynamometer, etc.):

- at a steady speed of 50 km/h until the consumable fuel power unit of the HEV starts up,
- or if a vehicle can not reach a steady speed of 50 km/h without starting up the fuel consuming power unit, the speed has to be reduced until the vehicle can run a lower steady speed where the fuel consuming power unit just does not start up for a defined time/distance (to be specified between technical service and manufacturer),
- or with manufacturer’s recommendation.
- The engine is stopped within 10 seconds after it has started.

- 6.2.2 For NOVC vehicles :
- 6.2.2.1 NOVC vehicles without an operating mode switch : the procedure starts with a preconditioning of 2 consecutive complete driving cycles (one Part One and one Part two) without soak.
- 6.2.2.2 NOVC vehicles with an operating mode switch : the procedure starts with a preconditioning of 2 consecutive complete driving cycles (one Part One and one Part two) without soak, performed with the vehicle running in hybrid mode. If several hybrid modes are available, the test is carried out in the mode which is automatically set after turn on of the ignition key (normal mode).
- 6.3 The preconditioning drive and the dynamometer test are carried out according to paragraph 5.2 and 5.4 of Annex 7 :
- 6.3.1 For OVC vehicles : under the same conditions as specified by condition B of the type I test (paragraphs 3.1.3 and 3.2.3).
- 6.3.2 For NOVC vehicles : under the same conditions as in the type I test.

7 TYPE V TEST METHODS

- 7.1 The vehicles are tested according to Annex 9.
- 7.2 For OVC vehicles :
For OVC vehicles with an operating mode switch, mileage accumulation should be driven in the mode which is automatically set after turn on of the ignition key (normal mode).
During the mileage accumulation a change into another hybrid mode is allowed in order to continue the mileage accumulation after agreement of the technical service.
It is allowed to charge the electrical energy/power storage device twice a day during mileage accumulation.
The measurements of emissions of pollutants are carried out under the same conditions as specified by condition B of the type I test (paragraphs 3.1.3 and 3.2.3)..
- 7.3 For NOVC vehicles :
For NOVC vehicles with an operating mode switch, mileage accumulation should be driven in the mode which is automatically set after turn on of the ignition key (normal mode).
The measurements of emissions of pollutants are carried out in the same conditions as in the type I test.

8 TYPE VI TEST METHODS

- 8.1 The vehicles are tested according to Annex 8.
- 8.2 For OVC vehicles, the measurements of emissions of pollutants are carried out under the same conditions as specified by condition B of the type I test (paragraphs 3.1.3 and 3.2.3).
- 8.3 For NOVC vehicles, the measurements of emissions of pollutants are carried out under the same conditions as in the type I test.

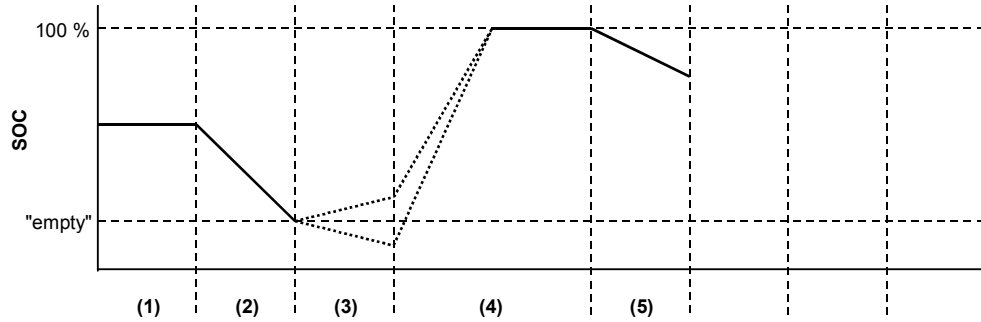
9 ON BOARD DIAGNOSTICS (OBD) TEST METHODS

- 9.1 The vehicles are tested according to Annex 11.
- 9.2 For OVC vehicles, the measurements of emissions of pollutants are carried out under the same conditions as specified by condition B of the type I test (paragraphs 3.1.3 and 3.2.3)..
- 9.3 For NOVC vehicles, the measurements of emissions of pollutants are carried out under the same conditions as in the type I test.

Annex 14 Appendix 1

Electrical energy/power storage device State Of Charge (SOC) profile for OVC HEV Type I test

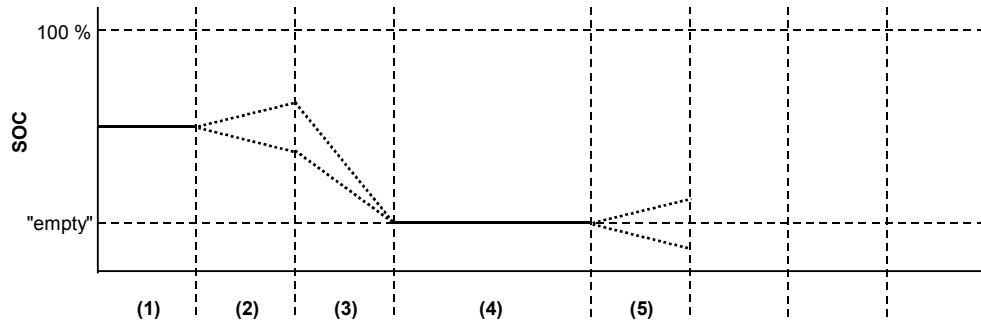
Condition A of the Type I test



Condition A

- (1) initial electrical energy/power storage device state of charge
- (2) discharge according to 3.1.2.1 or 3.2.2.1
- (3) vehicle conditioning according to 3.1.2.2 or 3.2.2.2
- (4) charge during soak according to 3.1.2.3 and 3.1.2.4 or 3.2.2.3 and 3.2.2.4
- (5) test according to 3.1.2.5 or 3.2.2.5

Condition B of the Type I test



Condition B

- (1) initial state of charge
- (2) vehicle conditioning according to 3.1.3.1 or 3.2.3.1
- (3) discharge according to 3.1.3.2 or 3.2.3.2
- (4) soak according to 3.1.3.3 or 3.2.3.3
- (5) test according to 3.1.3.4 or 3.2.3.4